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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/679,446	10/07/2003	Hiroo Takizawa	Q77850	3692

65565 7590 09/08/2008

SUGHRUE-265550
2100 PENNSYLVANIA AVE. NW
WASHINGTON, DC 20037-3213

EXAMINER	
ANGEBRANNDT, MARTIN J	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
09/08/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

## *Office Action Summary*	**Application No.** 10/679,446	**Applicant(s)** TAKIZAWA ET AL.
	Examiner Martin J. Angebranndt	**Art Unit** 1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 July 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12,13 and 18-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12,13 and 18-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. The response of the applicant has been read and given careful consideration. Responses to the arguments appear after the first rejection to which they are directed.

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 22 and 23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification as filed fails to describe "merocyanines". The dyes described do not include the necessary structure for a merocyanine dye. They are properly cyanine dyes with meso substitution or a ring in the meso position.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 12,13 and 22-23 are rejected under 35 U.S.C. 102(a) as being fully anticipated by Akiba et al. JP 2003-073410.

Akiba et al. JP 2003-073410 teaches that hyperfine three dimensional polymerized structure using two photon excitation [0001]. The reaction only occurs within the focal volume of the laser. [0002]. The use of cyanine dyes is taught (see dyes 13, 14, 27,28,41,42,55,56,69,70,83,84,97,98,111,112,125,126 and 139-140 in tables. The two photon dye can be used with either free radically or cationically polymerizable materials which may include binders and other additives [0037-0040]. The use of various lasers, including those operating at 620-680,780, ~1000 and 1053 nm is disclosed. [0041-0042]. See examples 1 and 2.

The examiner holds that position that one immediately envisions the use of the cyanine dyes illustrated in the tables in two photon processes based upon their disclosure as two photon absorbers. For the purposes of examination, the examiner holds that the dyes13, 14, 27,28,41,42,55,56,69,70,83,84,97,98,111,112,125,126 and 139-140, which are similar are embraced by the formulae I or II and have a central ring with a ketonic moiety are merocyanines within the applicant's intended meaning of the claim.

The examiner notes that the point of attachment language only applies when two of the partial structures are used and notes the compounds used in the applicants own tables at [0074] on pages 9-17 of their prepub having the carbonyl/ketonic group.

The applicant's arguments regarding merocyanine dyes are misplaced as they fail to apprciate that the dyes disclosed cannot be divided as shown on page 197 arbitrarily to meet the definition. Even were this to be reasonable, it is not comgrunet withe dyes disclosed in the instant specification as none of the dyes disclosed can be deveide in the manner shown without ribbing the other portion of a terminal moiety. The examiner does agree that dye 4 on page 196 is a merocyanine, but this teachings does not address the issue at hand. Further **there are numerous references from the art (see the Booker references) describing the dyes disclosed in the instant application as cyanine dyes. The rejection stand.**

7. Claims 12,13 and 22-23 are rejected under 35 U.S.C. 102(a) as being fully anticipated by Akiba et al. '124.

Akiba et al. '124 teaches that hyperfine three dimensional polymerized structure using two photon excitation [0001]. The reaction only occurs within the focal volume of the laser. [0005]. The use of cyanine dyes is taught (see dyes 13, 14, 27,28,41,42,55,56,69,70,83,84,97,98,111,112,125,126 and 139-140 in tables [0058]. The two photon dye can be used with either free radically or cationically polymerizable materials which may include binders and other additives [0069-0073]. The use of various lasers, including those operating at 620-680,780, ~1000 and 1053 nm is disclosed. [0092,0101]. See examples 1 and 2.

The examiner holds that position that one immediately envisions the use of the cyanine dyes illustrated in the tables in two photon processes based upon their disclosure as two photon absorbers. For the purposes of examination, the examiner holds that the dyes13, 14, 27,28,41,42,55,56,69,70,83,84,97,98,111,112,125,126 and 139-140, which are similar are embraced by the formulae I or II and have a central ring with a ketonic moiety are merocyanines within the applicant's intended meaning of the claim.

The examiner notes that the point of attachment language only applies when two of the partial structures are used and notes the compounds used in the applicants own tables at [0074] on pages 9-17 of their prepub having the carbonyl/ketonic group.

8. Claims 12,13 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over either (Akiba et al. JP 2003-073410 or Akiba et al. '124), in view of Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and JP 2002-072466.

Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) teaches the use of various cyanines, merocyanine and squarine dyes in two photon processes. The wavelength use of 1064 nm, which is outside the absorption range of the squarene dye as evidenced by Inaishi et al. '917.

JP 2002-072466 teaches composition where dye SSS-2 is used to cause photopolymerization. (table 1,0117,0114], to form an image in a printing plate using free radical based polymerization. The use of triazines in the compositions is disclosed. [0071-0074]. The use of this composition as a photoresist or the like is disclosed. [0001]. The methine chain can have a cycloalkene ring with 4-7 members. [0034].

To address embodiments using dyes not taught in the references above, the examiner cites Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and JP 2002-072466 and holds that it would have been obvious to modify the examples of either (Akiba et al. JP 2003-073410 or Akiba et al. '124) by using other cyanine dyes known to be useful in sensitizing polymerization reaction, such as dye SSS-22 taught by JP 2002-072466 with a reasonable expectation of there being a significant two photon absorption based upon the fact that various cyanine dyes are known to have two photon cross-sections as evidenced by Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000).

9. Claims 12,13 and 18-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over either (Akiba et al. JP 2003-073410 or Akiba et al. '124), in view of Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and JP 2002-072466 combined with any one of (Brooker et al. '964, Brooker et al. '805 or Brooker et al. '939).

Brooker et al. '964 teaches dyes of examples 1-3,6-15 and 21-54 which have absorptions at as long as ~700 nm.

Brooker et al. '805 teaches the dye of example 20 which exhibits two absorptions, one centered at ~400 nm and the other centered at ~675 nm. (see figure 3). See also dyes of examples 16a-20 and 22-27. The ring in the methine chain can be pentene or hexane (p can be 1 or 2).

Brooker et al. '939 teaches the dye of example 13 which exhibits two absorptions, one centered at ~425 nm and the other centered at ~690 nm. (see figure 3). See the dyes of examples 1-5, and particularly the dyes of examples 6-10. The ring can be a pentene or cyclohexene ring (1/54)

To address embodiments using dyes not taught in the references above, the examiner cites Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106

(2000) and JP 2002-072466 and holds that it would have been obvious to modify the processes rendered obvious by the combination of either (Akiba et al. JP 2003-073410 or Akiba et al. ‘124) withFeldner et al., “Non-linear optical properties of specific polymethines: influence of substitutents and chain length”, MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and JP 2002-072466 by using other dyes such as those disclosed by any one of (Brooker et al. ‘964, Brooker et al. ‘805 or Brooker et al. ‘939) based upon the disclosed equivalence to dyes having the meso substituent of dye SSS-2 of JP 2002-072466 with a reasonable expectation of there being a significant two photon absorption based upon the fact that various cyanine dyes are known to have two photon cross-sections as evidenced by Feldner et al., “Non-linear optical properties of specific polymethines: influence of substitutents and chain length”, MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000).

10. Claims 12, 13 and 22-23 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Scherer et al. “Two-photo states in squarine monomers and oligomers”, Chem. Phys., Vol 279(2-3) pp. 179-207 (06/2002).

The two photon induced fluorescence of monomeric dyes 13a-f (structures shown on page 183) and the two photon absorption cross-sections (δ) and the flourecence efficiency (Ω) are measured and presented in table 2 (page 190)

The point of attachment is only for the case where Y^{31} contains two of the recited partial stuctures. In the case of squaraine dyes only one partical stucture is present and the lower linkage is withinthe language describing R^{33} and R^{31} as being able to be bonded to each other without any further limitation on the groups facilitating this bonding.

11. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inaishi et al. '917, in view of Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and Devoe et al. WO 01/96917.

Inaishi et al. '917 teach the photocurable composition with polyethylene glycol diacrylate and pentaerythritol hexacryalte are photosensitive, a metal allene is the photoinitator and a squarine dye is the photosensitizer. It is disclosed that the composition is curable at 430 nm and 630 nm. (col 4-5).

Devoe et al. WO 01/96917 teaches the use of two photon processes to form three dimensional structures, such as optical elements (3/15-20). The exciting light is not attenuated by the composition outside the focal volume, which allows the formation of articles within a polymerizable composition and the formation of features smaller than the diffraction limit (3/21-4/9). The desirability of compounds able to sensitize 2-methyl-4,6-bis(chloromethyl)s-triazine or onium salts is disclosed. (27/9-14, 29/25-30/17).The two photon source operates in the 300-1500 nm range (9/20-10/2).

It would have been obvious to one skilled in the art to modify the process of the cited examples of Inaishi et al. '917 by using this composition with a two photon exposure process as disclosed by Devoe et al. WO 01/96917 to form smaller features (sub-diffraction limit) and/or three dimensional structures with a reasonable expectation of successfully realizing two photon absorption based upon the broad teachings of dye classes by Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and specifically with respect to a similar (monomeric) squarine dye disclosed as having a hyperpolarizability of -0.98 on pages 103-104 using a source operating in the 860 to 1260 nm range from those taught by Devoe et al. WO 01/96917.

The advantages of using two photon polymerization processes in being able to form three dimensional objects are clear from Devoe et al. WO 01/96917, particularly the with respect to the figures and this reference also teaches lasers operating in the appropriate wavelength range and this advantage would be expected to be appreciated by those within the art. The applicant argues that there is no reasons to combine the references. The examiner disagrees, noting the benefits in the type of structures capable of being formed using two photon processes as discussed by DeVoe et al. specifically with respect to photopolymerizable compositions. Therefore Inaishi et al. '917 and Devoe et al. WO 01/96917 are analogous and Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) provides a reasonable expectation of success based upon the disclosure of the two photon cross section of the squarene dye.

The applicant argues that the examiner is using an obviousness to try standard. The examiner disagrees, noting that Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) establishes that the dye will have a two photon absorption which produces a likelihood of success and the **motivation** comes form the three dimensional features which can be formed using two photon polymerization as taught by Devoe et al. WO 01/96917.

12. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smothers et at '977, in view of Devoe et al. WO 01/96917, Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and Foucault et al., "Two photon absorption in organic dyes relation with the symmetry of levels", Optics Comm. Vol. 15(3) pp. 412-415 (1975).

Smothers et al. '977 teach photocurable composition sensitized to the visible. These are useful in holographic recording or as photoresists (3/40). Example sensitizing dyes (S-1 through S-6) are shown in columns 13-16. There are described as having maximum absorption at 498-582 nm. See example compositions 1-19.

Foucault et al., "Two photon absorption in organic dyes relation with the symmetry of levels", Optics Comm. Vol. 15(3) pp. 412-415 (1975) teaches the use of various cyanines, xanthene and acridine dyes in two photon processes.

It would have been obvious to one skilled in the art to modify the process of the cited examples of Smothers et al. '977 by using this composition with a two photon exposure process as disclosed by Devoe et al. WO 01/96917 to form smaller features (sub-diffraction limit) and/or three dimensional structures with a reasonable expectation of successfully realizing two photon absorption based upon the broad teachings of dye classes by Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and/or Foucault et al., "Two photon absorption in organic dyes relation with the symmetry of levels", Optics Comm. Vol. 15(3) pp.

412-415 (1975) including cyanine dyes having two photon absorption using a source operating at ~1000 nm from those taught by Devoe et al. WO 01/96917.

As discussed above, the advantages of using two photon polymerization processes in being able to form three dimensional objects are clear from Devoe et al. WO 01/96917, particularly the with respect to the figures and this reference also teaches lasers operating in the appropriate wavelength range and this advantage would be expected to be appreciated by those within the art. The applicant argues that there is no reason to combine the references. The examiner disagrees, noting the benefits in the type of structures capable of being formed using two photon processes as discussed by DeVoe et al. specifically with respect to photopolymerizable compositions. Therefore Smothers et al. '977 and Devoe et al. WO 01/96917 are analogous both utilizing photopolymerizable compositions and Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and Foucault et al., "Two photon absorption in organic dyes relation with the symmetry of levels", Optics Comm. Vol. 15(3) pp. 412-415 (1975). provide a reasonable expectation of success based upon the disclosure of the two photon excitation of cyanine dyes.

The response above is relied upon here as the argued position is the same.

13. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumura et al. '995, in view of Devoe et al. WO 01/96917, Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and Foucault et al., "Two photon

absorption in organic dyes relation with the symmetry of levels", Optics Comm. Vol. 15(3) pp. 412-415 (1975).

Matsumura et al. '995 teach the photocurable composition using dye RD-2 (illustrated in column 27) in the table in column 25.

It would have been obvious to one skilled in the art to modify the process of the cited examples of Matsumura et al. '995 by using this composition with a two photon exposure process as disclosed by Devoe et al. WO 01/96917 to form smaller features (sub-diffraction limit) and/or three dimensional structures with a reasonable expectation of successfully realizing two photon absorption based upon the broad teachings of dye classes by Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and/or Foucault et al., "Two photon absorption in organic dyes relation with the symmetry of levels", Optics Comm. Vol. 15(3) pp. 412-415 (1975) including cyanine dyes having two photon absorption using a source operating at ~1000 nm from those taught by Devoe et al. WO 01/96917.

The response above is relied upon here as the argued position is the same.

14. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zammit et al. "Visible light pulsed laser polymerization at 532 nm employing a julolidine dye photosensitizer inintation system", Macromolecules Vol. 30(19) pp. 5655-5659 (1997), in view of Devoe et al. WO 01/96917, Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and Foucault et al., "Two photon absorption in organic dyes relation with the symmetry of levels", Optics Comm. Vol. 15(3) pp. 412-415 (1975).

Zammit et al. “Visible light pulsed laser polymerization at 532 nm employing a julolidine dye photosensitizer inintation system”, Macromolecules Vol. 30(19) pp. 5655-5659 (1997) teaches photopolymerizable compositions comprising methyl methacrylate and JAW.

It would have been obvious to one skilled in the art to modify the process of the cited examples of Zammit et al. “Visible light pulsed laser polymerization at 532 nm employing a julolidine dye photosensitizer inintation system”, Macromolecules Vol. 30(19) pp. 5655-5659 (1997) by using this composition with a two photon exposure process as disclosed by Devoe et al. WO 01/96917 to form smaller features (sub-diffraction limit) and/or three dimensional structures with a reasonable expectation of successfully realizing two photon absorption based upon the broad teachings of dye classes by Feldner et al., “Non-linear optical properties of specific polymethines: influence of substitutents and chain length”, MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and/or Foucault et al., “Two photon absorption in organic dyes relation with the symmetry of levels”, Optics Comm. Vol. 15(3) pp. 412-415 (1975) including cyanine dyes having two photon absorption using a source operating at ~1064 nm, such as an Nd-YAG fundamental from those taught by Devoe et al. WO 01/96917 and Zammit et al.

The response above is relied upon here as the argued position is the same.

15. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brooker et al. ‘351 or Brooker et al. ‘964, in view of Wu et al. “two photon exposure of photographic film” JOSA B:Opt. Phys. Vol. 16(4) pp. 605-608 combined with Feldner et al., “Non-linear optical properties of specific polymethines: influence of substitutents and chain length”, MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and/or Foucault et al., “Two

photon absorption in organic dyes relation with the symmetry of levels", Optics Comm. Vol. 15(3) pp. 412-415 (1975).

Brooker et al. '351 teach dyes used in examples 1-3. These are embodiments of formula 3.

Wu et al. "two photon exposure of photographic film" JOSA B:Opt. Phys. Vol. 16(4) pp. 605-608 (1997) teaches increased spatial resolution and the possibility of three dimensional storage when two photon recording processes are used. (page 605/left column). The laser source is a Ti:sapphire laser operating at 800 nm with 120 fs pulses. (page 605/right column).

It would have been obvious to one skilled in the art to use the cyanine dyes taught by **either of** Brooker et al. '964 or Brooker et al. '351 in two photon processes such as those taught by Wu et al. "two photon exposure of photographic film" JOSA B:Opt. Phys. Vol. 16(4) pp. 605-608 with a reasonable expectation of successfully realizing two photon absorption based upon the broad teachings of dye classes by Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and/or Foucault et al., "Two photon absorption in organic dyes relation with the symmetry of levels", Optics Comm. Vol. 15(3) pp. 412-415 (1975) including cyanine dyes having two photon absorption. With a reasonable expectation of forming an image based upon the prior use of two photon processes to record information in photographic emulsions by Wu et al. "two photon exposure of photographic film" JOSA B:Opt. Phys. Vol. 16(4) pp. 605-608.

In response to the arguments of the applicant the examiner cites Wu et al. "two photon exposure of photographic film" JOSA B:Opt. Phys. Vol. 16(4) pp. 605-608 who teaches the use of two photon recording in photographic film which renders it analogous to Brooker et al. ‘964 and Brooker et al. ‘351. It is clear that Wu et al. “two photon exposure of photographic film” JOSA B:Opt. Phys. Vol. 16(4) pp. 605-608 takes care to avoid single phtono excitation and the citation of Feldner et al., “Non-linear optical properties of specific polymethines: influence of substitutents and chain length”, MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and Foucault et al., “Two photon absorption in organic dyes relation with the symmetry of levels”, Optics Comm. Vol. 15(3) pp. 412-415 (1975) provide a reasonable expectation of success based upon the disclosure of the two photon excitation of cyanine dyes.

The applicant argues that the examiner is using an obviousness to try standard. The examiner disagrees, noting that Feldner et al., “Non-linear optical properties of specific polymethines: influence of substitutents and chain length”, MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) establishes that the dye will have a two photon absorption which produces a likelihood of success and the **motivation** comes from the teachings of Wu et al. “two photon exposure of photographic film” JOSA B:Opt. Phys. Vol. 16(4) pp. 605-608 relating to three dimensional storage and increased spatial resolution.

16. Claims 12,13 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over **either of** Brooker et al. ‘805 or Brooker et al. ‘939 (aka White on PTO 892), in view of Wu et al. “two photon exposure of photographic film” JOSA B:Opt. Phys. Vol. 16(4) pp. 605-608 combined with Feldner et al., “Non-linear optical properties of specific polymethines: influence of substitutents and chain length”, MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and/or Foucault et al., “Two photon absorption in organic dyes relation with the symmetry of levels”, Optics Comm. Vol. 15(3) pp. 412-415 (1975).

It would have been obvious to one skilled in the art to use the cyanine dyes taught by **either of** Brooker et al. '805 or Brooker et al. '939 in two photon processes such as those taught by Wu et al. "two photon exposure of photographic film" JOSA B:Opt. Phys. Vol. 16(4) pp. 605-608 with a reasonable expectation of successfully realizing two photon absorption based upon the broad teachings of dye classes by Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and/or Foucault et al., "Two photon absorption in organic dyes relation with the symmetry of levels", Optics Comm. Vol. 15(3) pp. 412-415 (1975) including cyanine dyes having two photon absorption. With a reasonable expectation of forming an image based upon the prior use of two photon processes to record information in photographic emulsions by Wu et al. "two photon exposure of photographic film" JOSA B:Opt. Phys. Vol. 16(4) pp. 605-608 and the absorption of these dyes at ~ 400 nm.

Further it would have been obvious to use the dyes with a dicyanomethenecyclopentene central moiety such as those disclosed by Brooker et al. '805 or Brooker et al. '939 as the dye in the photographic film used in the two photon process based upon the disclosure of equivalence.

The response above is relied upon here as the argued position is the same.

17. Claims 12,13 and 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over **either of** Brooker et al. '805 or Brooker et al. '939(aka White on PTO 892), in view of Wu et al. "two photon exposure of photographic film" JOSA B:Opt. Phys. Vol. 16(4) pp. 605-608 combined with Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and/or Foucault et al., "Two photon absorption in organic dyes relation with the

symmetry of levels", Optics Comm. Vol. 15(3) pp. 412-415 (1975), further in view of JP 2002-072466.

To address the embodiments where the cycloalkene ring is cycloheptane, the examiner cites JP 2002-072466 which teaches dyes similar to those disclosed by Brooker et al. '805 or Brooker et al. '939 and teaches that the cycloalkene can be a C4-C7 cycloalkene and holds that it would have been obvious to one skilled in the art to modify the examples of **either of** Brooker et al. '805 or Brooker et al. '939, in the process of **either of** Brooker et al. '805 or Brooker et al. '939 combined with Wu et al. "two photon exposure of photographic film" JOSA B:Opt. Phys. Vol. 16(4) pp. 605-608, Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and/or Foucault et al., "Two photon absorption in organic dyes relation with the symmetry of levels", Optics Comm. Vol. 15(3) pp. 412-415 (1975) by using a cycloheptene ring in place of the cyclopentene rings exemplified with a reasonable expectation of forming a recorded area based upon the disclosure of equivalence an the prior use of two photon processes with photographic film.

The use of the dyes to sensitize photosensitive compositions is the point of similarity in JP 2002-072466 and **either of** Brooker et al. '805 or Brooker et al. '939 and shows them to be analogeous and JP 2002-072466 demonstrates the equivalence of the cyclopentane, cyclohexane and cycloheptane rings, thereby providing a reasonable expectation of success in forming a useful composition using any of them.

18. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2002-072466, in view of Devoe et al. WO 01/96917, Feldner et al., "Non-linear optical properties of specific

polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and Foucault et al., "Two photon absorption in organic dyes relation with the symmetry of levels", Optics Comm. Vol. 15(3) pp. 412-415 (1975).

It would have been obvious to one skilled in the art to modify the process of the cited examples of JP 2002-072466 by using this composition with a two photon exposure process as disclosed by Devoe et al. WO 01/96917 to form smaller features (sub-diffraction limit) and/or three dimensional structures with a reasonable expectation of successfully realizing two photon absorption based upon the broad teachings of dye classes by Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and/or Foucault et al., "Two photon absorption in organic dyes relation with the symmetry of levels", Optics Comm. Vol. 15(3) pp. 412-415 (1975) including cyanine dyes having two photon absorption.

The use of the dyes to sensitize photosensitive compositions is the point of similarity in JP 2002-072466 and Devoe et al. WO 01/96917and shows them to be analogeous and JP 2002-072466 demonstrates the equivalence of the cyclopentane, cyclohexane and cycloheptane rings, noting that Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) establishes that the dye will have a two photon absorption which produces a likelihood of success and the **motivation** comes form the three dimensional features which can be formed using two photon polymerization as taught by Devoe et al. WO 01/96917.

19. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over either of either Urano et al. '356 or JP 09-134009, in view of Marder et al. '683, Devoe et al. WO 01/96917,

Feldner et al., “Non-linear optical properties of specific polymethines: influence of substitutents and chain length”, MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and Foucault et al., “Two photon absorption in organic dyes relation with the symmetry of levels”, Optics Comm. Vol. 15(3) pp. 412-415 (1975).

Urano et al. ‘356 (example 1, where A is barbituric acid) exemplifies a photopolymerizable composition which use cyanine dyes to sensitize the compositions (27/49-64).

JP 09-134009 [0070, IR-22] describes photopolymerizable compositions which use cyanine dyes to sensitize the compositions to IR. Example 9 in table 2 [0118] uses this dye.

Marder et al. WO 02/079691 teach the use of two photon recording compositions to form printing plates. [0171]. The two photon efficiencies are disclosed in table 1 on page 1 (col 84) and tables 2-3 and have values of up to 13,000 GM.

It would have been obvious to one skilled in the art to modify the process of the cited examples of Nakamura et al. ‘128 or JP 2002-072466 by using this composition with a two photon exposure process as disclosed by Devoe et al. WO 01/96917 to form smaller features (sub-diffraction limit) and/or three dimensional structures with a reasonable expectation of successfully realizing two photon absorption based upon the broad teachings of dye classes by Feldner et al., “Non-linear optical properties of specific polymethines: influence of substitutents and chain length”, MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and/or Foucault et al., “Two photon absorption in organic dyes relation with the symmetry of levels”, Optics Comm. Vol. 15(3) pp. 412-415 (1975) including cyanine dyes having two photon absorption and based upon the teaching of the use of two photon absorbing compositions in forming printing plates by Marder et al. WO 02/079691.

The examiner notes that Urano et al. '356, JP 09-134009, Marder et al. '683 and Devoe et al. WO 01/96917 are all within the photopolymerization art and therefore are analogous and Feldner et al., "Non-linear optical properties of specific polymethines: influence of substitutents and chain length", MCLC S&T Sec. B, Nonlinear Optics vol. 26(1-3) pp. 99-106 (2000) and Foucault et al., "Two photon absorption in organic dyes relation with the symmetry of levels", Optics Comm. Vol. 15(3) pp. 412-415 (1975). provide a reasonable expectation of success based upon the disclosure of the two photon excitation of cyanine dyes. **Clearly, the wavelength and pulse duration (see table 3 of Marder) have an effect on the cross section and it is not clear that the experiments of the applicant in tables 1-3 have accounted for the different absorptions of the dyes. Clairifying this (absorption profiles of the dyes) might help to show unobvious results.**

The response above is relied upon here as the argued position is the same. The applicant also argues that the dyes of the instant invention are neutral. This position is without merit noting the salts of compounds D6, D-7,D-36,D-37, F-5 and others which are bounded by the claims. The absence of a recitation of a counter-ion does not exclude the presence of one, noting the open "comprising" claim language. The applicant's position also fails to take into account the resonance structures of the compounds.

20. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible

harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

21. Claims 12,13,22 and 23 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 2,4,9-16 and 21-22 of U.S. Application No. 10/233424 (US 2003/0162124). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims seek coverage for the same process using the meso ketonic cyanine dyes, which the applicant describes as merocyanines.

22. Claims 12,13,22 and 23 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 8,10,12 and 14 of U.S. Application No. 11/062948 (US 2005/0156147). Although the conflicting claims are not identical, they are not

patentably distinct from each other because the claims seek coverage for the same process using the meso ketonic cyanine dyes, which the applicant describes as merocyanines.

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J. Angebranndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Martin J Angebranndt/
Primary Examiner, Art Unit 1795

Martin J Angebranndt
Primary Examiner
Art Unit 1795

9/5/08